IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

Appellant(s):	Arvind Arun Pande; Saurabh Ramchandra Godbole; Anand A. Kekre		
Assignee:	VERITAS Operating Corporation		
Title:	PROPAGATING RESULTS OF A VOLUME-CHANGING OPERATION TO REPLICATED NODES		
Serial No.:	10/675,505	Filed:	September 30, 2003
Examiner:	Robert M. Timblin	Group Art Unit:	2167
Docket No.:	VRT0097US	Confirmation No.:	6043

Austin, Texas
May 16, 2007

Mail Stop: Appeal Brief - Patents
Commissioner for Patents
P.O. Box 1450
Alexandria, VA 22313-1450

SUBSTITUTE APPEAL BRIEF UNDER 37 CFR § 41.37

Dear Sir:

This brief is submitted in response to the Notification of Non-Compliant Appeal Brief dated May 9, 2007, and replaces the brief filed on March 2, 2007, in support of the Notice of Appeal filed December 26, 2006 by the appellants to the Board of Patent Appeals and Interferences from the Examiner's final rejection of claims 1-5, 7-11, 13-17, 19-21, 23 and 24. This brief includes revised headings "Summary of Claimed Subject Matter" and "Grounds of Rejection to Be Reviewed on Appeal" which remedies the defects described in the Notification of Non-Compliant Appeal Brief. The fee for filing an appeal brief was paid with the brief filed on March 2, 2007. No new fee is required to be paid with this substitute brief.

REAL PARTY IN INTEREST

The real party in interest on this appeal is VERITAS Operating Corporation.

RELATED APPEALS AND INTERFERENCES

There are no appeals or interferences related to this application.

STATUS OF CLAIMS

Claims 1-5, 7-8, 11, 13-17, 19-21, and 23-24 are rejected under 35 U.S.C. § 103(a) as being obvious over Huras (U.S. Patent Publication 2005/0278393) (hereinafter referred to as "Huras") in view of Shih et al. (U.S. Patent No. 6,615,223) (hereinafter referred to as "Shih").

Claims 9 and 10 are rejected under 35 U.S.C. § 103(a) as being obvious over Huras in view of Shih in further view of Lomet (U.S. Pat. 6,578,041).

Claims 6, 12, 18, and 22 have been canceled.

Claims 1-5, 7-11, 13-21, and 23-24 are appealed.

STATUS OF AMENDMENTS

No amendments were filed subsequent to the final rejection of September 18, 2006.

SUMMARY OF CLAIMED SUBJECT MATTER

Claim 1 recites a method that involves determining that a change occurred to data in a first region of a first plurality of regions of a first volume. *See e.g.*, FIG. 3, operation 310, FIG. 5, operation 530 and 526 or 520, and Specification, paragraphs 53 and 75-76. The change resulted from a restore operation. *See e.g.*, Specification, paragraphs 53 and 77. In response to determining that the change occurred, the method updates information identifying a set of regions designated for replication to a second volume. *See e.g.*, FIG. 3, operation 320, FIG. 5, operations 530 and 540, and Specification, paragraphs 53 and 77. Subsequent to the update to the information, the first region is included in the set of regions designated for replication to the second volume. *See e.g.*, FIG. 3, operation 320, FIG. 5, operation 540, and Specification, paragraphs 53 and 77.

Claim 14 recites a system that includes determining means and adding means. *See e.g.*, replication facility 420A of FIG. 4. The determining means (*e.g.*, replication facility 420A of FIG. 4) are means for determining that a change, which resulted from a restore operation, occurred to data in a first region of a first plurality of regions of a first volume. *See e.g.*, volumes 440A1 and 440A2 of FIG. 4, and paragraphs 73-79. The adding means (*e.g.*, DCM 470A and replication facility 420A of FIG. 4) are means for adding the first region to the set of regions designated for replication to a second volume. The region is added by updating information (*e.g.*, DCM 470A) identifying the set of regions designated for replication. *See e.g.*, FIG. 5, operation 540, and Specification, paragraph 77.

Claim 17 recites a system that includes a determining module (*e.g.*, replication facility 420A of FIG. 4) and an updating module (*e.g.*, DCM 470A and replication facility 420A of FIG. 4). The determining module is configured to determine that a change, which resulted from a restore operation, occurred to data in a first region of a first plurality of regions of a first volume. *See e.g.*, FIG. 3, operation 310, FIG. 5, operation 530 and 526 or 520, and Specification, paragraphs 53 and 75-76. The updating module is configured to update information identifying a set of regions designated for replication from the first volume to a second volume. *See e.g.*, FIG. 3, operation 320,

FIG. 5, operations 530 and 540, and Specification, paragraphs 53 and 77. Subsequent to the information being updated, the first region is included in the set of regions designated for replication to the second volume. *See e.g.,* FIG. 3, operation 320, FIG. 5, operation 540, and Specification, paragraphs 53 and 77.

Claim 21 describes a computer-readable medium (*e.g.,* such as system memory 617, fixed disk 666, optical disk 662, or floppy disk 638 of FIG. 6) that comprises determining instructions and updating instructions. See e.g., Specification, paragraph 88. The determining instructions are executable to determine that a change, which resulted from a restore operation, occurred to data in a first region of a first plurality of regions of a first volume. *See e.g.,* FIG. 3, operation 310, FIG. 5, operation 530 and 526 or 520, and Specification, paragraphs 53 and 75-76. The updating instructions are configured to update information identifying a set of regions designated for replication from the first volume to a second volume. *See e.g.,* FIG. 3, operation 320, FIG. 5, operations 530 and 540, and Specification, paragraphs 53 and 77. Subsequent to the information being updated, the first region is included in the set of regions designated for replication to the second volume. *See e.g.,* FIG. 3, operation 320, FIG. 5, operation 540, and Specification, paragraphs 53 and 77.

GROUNDS OF REJECTION TO BE REVIEWED ON APPEAL

Whether claims 1-5, 7-8, 11, 13-17, 19-21, and 23-24 are patentable over under 35 U.S.C. § 103(a) over Huras (U.S. Patent Publication 2005/0278393) (hereinafter referred to as "Huras") in view of Shih et al. (U.S. Patent No. 6,615,223) (hereinafter referred to as "Shih").

Whether claims 9 and 10 are patentable under 35 U.S.C. § 103(a) as being obvious over Huras in view of Shih in further view of Lomet (U.S. Pat. 6,578,041).

ARGUMENT

Rejection of claims 1-5, 7-8, 11, 13-21, and 23-24 under § 103(a)

Claim 1 is rejected under 35 U.S.C. § 103(a) as being obvious over Huras (U.S. Patent Publication 2005/0278393) (hereinafter referred to as "Huras") in view of Shih et al. (U.S. Patent No. 6,615,223) (hereinafter referred to as "Shih"). Appellant respectfully requests that claim 1 be found patentable over the cited art for the reasons set forth below.

The cited art tracks transactions affecting a database, not changes to a volume

With respect to claim 1, the cited art fails to teach or suggest "determining that a change occurred to data in a first region of a first plurality of regions of a first volume." In the Final Office Action mailed September 18, 2006 (hereinafter referred to as "FOA"), the Examiner relies upon table spaces 1-4 of FIG. 2 and paragraph 36 of Huras to teach this feature of claim 1. FOA, pp. 2-3. It is noted that Shih is not relied upon to teach this feature of claim 1.

Paragraph 36 of Huras recites:

> Each log file 107 can contain many log records. Each log record records a transaction that interacted with the various tablespaces contained in the database. Typically, roll forward 106 can comprise processing selected log files in a serial manner, such as starting from one log file (e.g., log file #10) and onwards to a succeeding log file (e.g., log file #14) in a discriminatory manner as further described below.

Thus, the log file in Huras records transactions that affect tablespaces in a database. Since a database is clearly not a volume, and since tablespaces are clearly not regions of a volume, the cited portion of Huras is clearly not describing tracking changes that affect data in a particular region of a volume. Furthermore, the transactions described in Huras operate on databases and are clearly different than the change described in claim 1, which modifies data in a first region of a volume.

FIG. 2 of Huras illustrates a data processing system 202, which includes memory 204. Database 208, which includes table spaces 1-4, is stored in memory 204. Thus, FIG. 2 shows that Huras's system is monitoring changes to a database stored in memory, not changes to regions of a volume.

In the Advisory Action mailed November 27, 2006 (hereinafter referred to as "AA"), the Examiner further cites paragraphs 21 and 32 of Huras as teaching the above-cited feature of claim 1. However, these paragraphs merely reiterate that Huras tracks changes to tablespaces in the log file and that the log file can be used in database recovery. These paragraphs do not provide any additional teaching or suggestion regarding tracking changes to regions of a volume.

From the portions of Huras cited by FOA and AA, it is clear that Huras tracks changes at the database level, not at the volume level. Accordingly, Huras clearly does not teach or suggest "determining that a change occurred to data in a first region of a first plurality of regions of a first volume."

The cited art tracks transactions, not changes resulting from a restore operation

The cited art also fails to teach or suggest that "the change resulted from a restore operation," as recited in claim 1. In the FOA, The Examiner states that paragraphs 20 and 35 of Huras teach that the "change" (which the Examiner equates with the transaction that affects a tablespace and is recorded in a log file) resulted from a restore operation. FOA, p. 3. However, paragraph 20 simply describes how Huras's system can log transactions affecting tablespaces and replay those transactions to recover a database. There is absolutely no indication in the cited portions of Huras that the transactions were caused by a restore operation.

Paragraph 30 states: "A database management system (see FIG. 2) is used to recover the tablespace with minimal errors by restoring a backup version of the tablespace (indicated as backup 104), from Monday. The database management system obtains the backup 104 of the tablespace and begins a roll forward operation, roll forward 106 of selected log files 107 to the beginning of Tuesday." Accordingly, the cited

portions of Huras teach that a tablespace can be recovered by first restoring the tablespace from backup and then applying transactions recorded in selected log files to the tablespace. These selected log files store transactions that affected the tablespace between the time that the backup version was created and the desired restore time. *See also* Huras, paragraph 69.

The cited portions of Huras neither teach nor suggest that any changes resulting from restoring a tablespace from backup be recorded in the log file (i.e., Huras suggests no need to record the changes that occur during the restore operation). Instead, Huras simply notes that (1) transactions (which in no way appear to be equivalent to changes that result from a restore operation) that affect a tablespace can be recorded in a log file and (2) after a restore from backup, the already-created log files can be used to further recover the tablespace. Using the already-created log file during a recovery operation is quite clearly not the same as determining that a change resulted from the recovery operation.

The Examiner also appears to equate transactions that occur subsequent to the making of a backup with a change resulting from a restore operation, stating: "The changes resulted from a restore operation is then taught as a log file representing changes made as a result of a transaction executed against the tablespace subsequent to the making of the backup version." AA, p. 2 #1. Appellant notes that making a backup is quite clearly not the same as performing a restore operation (in fact, the two actions are more properly considered opposites; the former involves copying information from the database to backup, while the latter applies information from the backup to the database). Furthermore, the transactions that occur subsequent to the creation of a backup operation are clearly not part of either the backup's creation or the backup's use in a restore operation. Accordingly, such transactions are quite clearly not changes resulting from a restore operation.

In AA, the Examiner further states that "tablespace change history table 215 [of FIG. 4 of Huras] works with the log file in a way that records modifications of the tablespaces by the log records." AA, p. 2 #2. However, tablespace change history table 215 does not record changes that result from a restore operation. Instead, as described in

paragraphs 46-54 (also cited in AA), the tablespace change history table 215 simply identifies which tablespaces were modified by the transactions recorded in a particular log file. For example, tablespace change history table 215 indicates that tablespaces 1-4 were modified by transactions #1 and #2, which are recorded in log file #10. Huras, FIG. 4, paragraphs 43 and 47. Thus, tablespace change history table 215 simply identifies the tablespaces that were modified by the transactions recorded in each log file.

Nothing in paragraphs 46-54 of Huras teaches or suggests that tablespace change history table 215 stores changes to a region of a volume that are "caused by a restore operation." Instead, these paragraphs simply describe how tablespace change history table 215 can store information describing the transactions recorded in the log files (paragraphs 46-51) and be used to recover a tablespace (i.e., the DBMS can recover tablespaces identified in the tablespace change history table by replaying the log records 307 within the corresponding log file) (paragraphs 52-54). Nothing suggests that tablespace change history table 215 is modified during or in response to restoration or recovery (instead, the table is used to identify the log files to replay). Accordingly, tablespace change history table 215 and its corresponding description do not, and in fact cannot, teach or suggest identifying changes that result from a restore operation.

For the foregoing reasons, the cited portion of Huras does not teach or suggest that the "transaction" recorded in the log file (and equated with the "change" of claim 1) resulted from a restore operation or that the tablespace change history table identifies changes that resulted from a restore operation. Shih, which is correctly not relied upon to teach this feature of claim 1, also fails to teach or suggest "the change resulted from a restore operation."

The cited art tracks transactions for replay, not changes, which resulted from a restore operation, for use in replication

Finally, the cited art fails to teach or suggest "in response to determining that the change [which resulted from a restore operation] occurred, updating information identifying a set of regions designated for replication to a second volume, wherein subsequent to the updating the information, the first region [which was modified by the

change] is included in the set of regions designated for replication to the second volume," as recited in claim 1. As noted above, none of the cited art teaches or suggests that changes resulting from a restore operation be identified (e.g., in Huras's log file or tablespace change history table), let alone that the region of a volume modified by such a change be designated for replication.

The Examiner equates the log files in Huras with the information in claim 1. FOA, p. 3. However, as noted above, the log files record transactions that can be replayed in order to recover a tablespace, not to replicate a volume. The cited portions of Huras fail to teach or suggest using the log files in the act of replicating data from one volume to another. Instead, these portions of Huras make no mention of replication at all.

Additionally, the cited portions of both Huras and Shih fail to teach or suggest that a region of a volume that is modified by a change caused by a restore operation should be designated for replication. In particular, neither reference makes any suggestion that regions of a volume changed by a restore operation should be designated for replication. Accordingly, the cited art also fails to teach or suggest "updating information identifying a set of regions designated for replication" to designate a region changed by a restore operation.

For at least the foregoing reasons, claim 1 is patentable over the cited art. Claims 3-5, 7-8, 11, 13-17, 19-21, and 23-24 are patentable over the cited art for similar reasons.

Rejection of claims 1-5, 7-8, 11, 13-21, and 23-24 under § 103(a)

Claims 9 and 10 are rejected under 35 U.S.C. § 103(a) as being obvious over Huras in view of Shih in further view of Lomet (U.S. Pat. 6,578,041). These claims, which depend from claim 1, are patentable over the cited art for at least the foregoing reasons presented above with respect to claim 1.

CONCLUSION

The appellants respectfully submit that claims 1-5, 7-8, 11, 13-17, 19-21, and 23-24 are allowable over the cited references for at least the above-stated reasons. The Appellants respectfully request that the Board reverse the rejections of these claims.

Respectfully submitted,

Brenna A. Brock
Attorney for Appellant
Reg. No. 48,509
512-439-5087
512-439-5099 (fax)

CLAIMS APPENDIX

1. (Previously Presented) A method comprising:

determining that a change occurred to data in a first region of a first plurality of regions of a first volume, wherein the change resulted from a restore operation; and

in response to determining that the change occurred, updating information identifying a set of regions designated for replication to a second volume, wherein subsequent to the updating the information, the first region is included in the set of regions designated for replication to the second volume.

2. (Original) The method of claim 1 wherein

the change occurred to the data in the first region as a result of restoring at least one region of the first plurality of regions from a second set of regions of a third volume.

3. (Original) The method of claim 2 wherein

the third volume is a snapshot of the first volume at one point in time.

4. (Previously Presented) The method of claim 1 wherein

a second region of the first plurality of regions is included in the set of regions designated for replication when

a respective change to the second region is added to a log comprising at least one change to at least one region, wherein

each of the at least one region in the log is designated for replication to the second volume.

5. (Original) The method of claim 4 wherein

a third region of the first plurality of regions is included in the set of regions designated for replication when

a second respective change occurs to the third region, and

the second respective change to the third region cannot be added to the log.

6. (Canceled)

7. (Previously Presented) The method of-claim 1 further comprising:

replicating each region in the set of regions designated for replication from the first volume to the second volume.

8. (Original) The method of claim 7 wherein

the replicating each region does not comprise replicating all regions from the first volume to the second volume.

9. (Original) The method of claim 7 wherein

the replicating continues during the restoring.

10. (Original) The method of claim 7 wherein

the data are accessible during the replicating.

11. (Original) The method of claim 7 wherein

the data are accessible during the restoring.

12. (Canceled)

13. (Original) The method of claim 1 wherein

a second region of the first plurality of regions is included in the set of regions designated for replication when

a second respective change occurs to the second region, and

the second respective change cannot be added to a log of changes to at least one region, wherein

each region of the at least one region in the log is included in the set of regions designated for replication.

14. (Previously Presented) A system comprising:

determining means for determining that a change occurred to data in a first region of a first plurality of regions of a first volume, wherein the change resulted from a restore operation; and

adding means for adding the first region to the set of regions designated for replication to a second volume, wherein the region is added by updating information identifying the set of regions designated for replication.

15. (Original) The system of claim 14 further comprising:

replicating means for replicating each region in the set of regions designated for replication from the first volume to the second volume.

16. (Original) The system of claim 15 wherein

the replicating means do not replicate all regions from the first volume to the second volume.

17. (Previously Presented) A system comprising:

a determining module to determine that a change occurred to data in a first region of a first plurality of regions of a first volume, wherein the change resulted from a restore operation; and

an updating module to update information identifying a set of regions designated for replication from the first volume to a second volume, wherein subsequent to the information being updated, the first region is included in the set of regions designated for replication to the second volume.

18. (Canceled)

19. (Original) The system of claim 17 further comprising:

a replicating module to replicate each region in the set of regions designated for replication from the first volume to the second volume.

20. (Original) The system of claim 17 wherein

the replicating module does not replicate all regions from the first volume to the second volume.

21. (Previously Presented) A computer-readable medium comprising:

determining instructions to determine that a change occurred to data in a first region of a first plurality of regions of a first volume, wherein the change resulted from a restore operation; and

updating instructions to update information identifying a set of regions designated for replication from the first volume to a second volume, wherein subsequent to the information being updated, the first region is included in the set of regions designated for replication to the second volume.

22. (Canceled)

23. (Original) The computer-readable medium of claim 21 further comprising:

replicating instructions to replicate each region in the set of regions designated for replication from the first volume to the second volume.

24. (Original) The computer-readable medium of claim 21 wherein the replicating instructions do not replicate all regions from the first volume to the second volume.

EVIDENCE APPENDIX

None

RELATED PROCEEDINGS APPENDIX

None